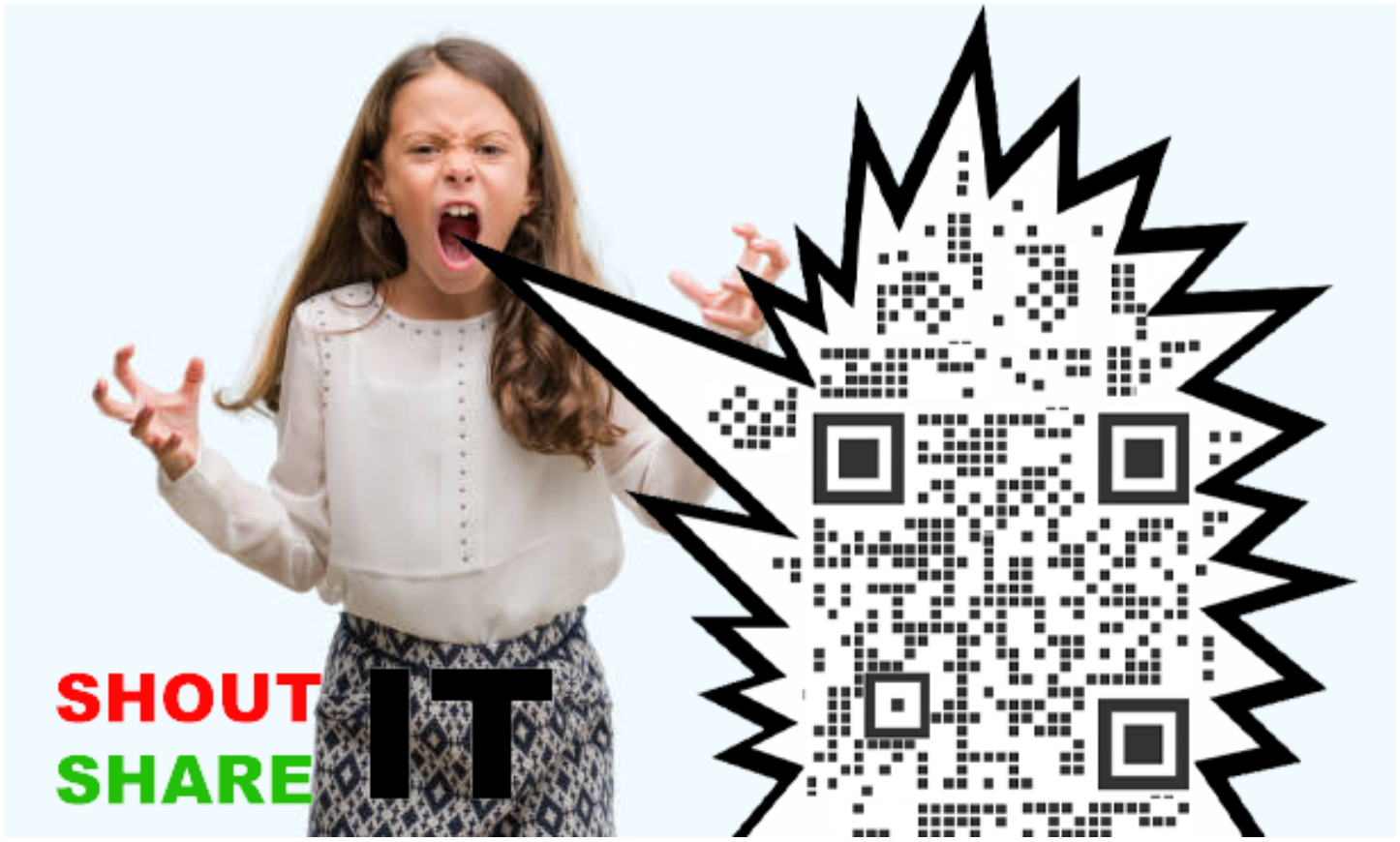
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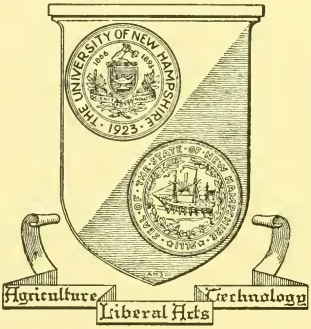


The University
of
New Hampshire

Production and Utilization of Milk By-Products in New Hampshire

By J. R. Bowring

Seasonal variations in milk supply and sales by classes, New Hampshire, 1955, for sample group of dealers. Vertical figures at left are millions of pounds.

AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF NEW HAMPSHIRE
DURHAM, NEW HAMPSHIRE

This study is part of a Northeast Regional Project, NEM-13, The Production-Consumption Balance and Efficient Utilization of Milk for Non-Fluid Uses in the Northeastern Milksheds, a cooperative study involving agricultural experiment stations in the Northeastern Region and supported in part by regional funds of the United States Department of Agriculture.

Acknowledgments

The cooperation of New Hampshire milk dealers and producers has made this study possible and is appreciated. Particular acknowledgment is given to Aaron Chadbourn who as a Research Assistant helped in the collection and analysis of these data and in the formulation of the conclusions.

Production and Utilization of Milk By-Products in New Hampshire

By J. R. Bowring*

Introduction

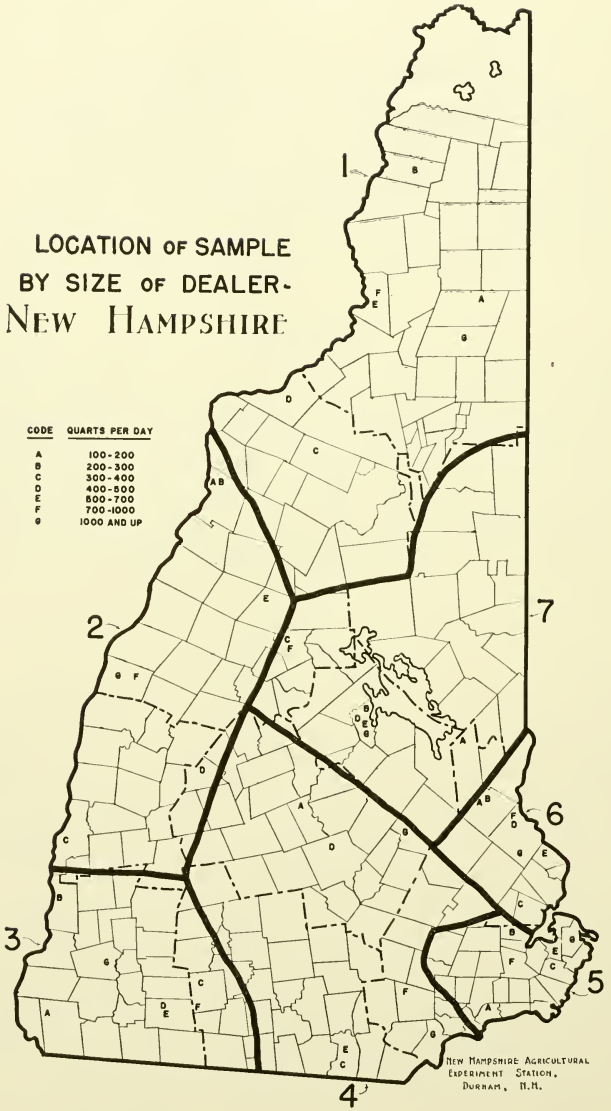
MILK sales are one of the major sources of farm income in New Hampshire. In addition to farm income there are many truckers, workers, and dealers who gain their livelihood processing and distributing milk. Milk is sold by dealers as fluid whole milk and in the form of milk products. The sale of fluid whole milk delivered to homes, stores, and restaurants is the primary source of income. Sales of by-products such as heavy and light cream, flavored drinks, cottage cheese, and ice cream are supplementary to the fluid milk sales. Nevertheless they are an important part of the dairy industry. It is our purpose to measure the extent of these sales and to discuss problems associated with their pricing and procurement.

Procedure of Study

Most milk dealers are registered with the New Hampshire Milk Control Board. There are a few exceptions in isolated regions where consumption and production is small, accounting for less than ten percent of the number of dealers, and less than ten percent of the quantity sold. For purposes of this study, the registered milk dealers were classified by size of license. Those selling less than 100 quarts per day were excluded, because the majority of these are producer-distributors who have little or no surplus disposal problems. The remaining dealers were selected to give equal representation to size group and to geographic location in the state.

The state was divided into seven regions to coincide with the major secondary milksheds in the state. In the seven regions one dealer from each of seven size groups was selected. Size was determined by size of license held. After interviewing the sample, some adjustment for size was necessary and two dealers were omitted because they turned out to be commission men for other processors, without their own processing facilities. The location of the sample interviewed is shown in Figure 1. The findings from ths survey form the basis for the following analysis. This representative sample is presumed to be typical for the dealers in the state.

* Associate Agricultural Economist, Agricultural Experiment Station.


LOCATION OF SAMPLE
BY SIZE OF DEALER-
NEW HAMPSHIRE
CODE QUARTS PER DAY
A 100-200
B 200-300
C 300-400
D 400-500
E 500-700
F 700-1000
G 1000 AND UP
1
2
3
4
5
6
7
NEW HAMPSHIRE AGRICULTURAL
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DURHAM, N.H.

Figure 1.

Licensed Milk Sales

There were 453 dealers licensed to sell milk in New Hampshire in 1955. Of these dealers 24 were located in Massachusetts, 6 in Maine, 3 in Vermont, and 410 in New Hampshire. Of the 410 license holders in New Hampshire, 223 were licensed to sell less than 100 quarts of milk a day. This means that 53 percent of the New Hampshire dealers were licensed to sell 3.4 percent of the total milk handled by licensed New Hampshire dealers.

Table 1. Holders of New Hampshire Milk Licenses by Size and by State of Residence

Size of License by Qts. per Day	No. of Licenses by State of Residence				Total Licenses
	N. H.	Maine	Mass.	Vt.	
Less than 100	223	5	16	3	247
101-200	48	1	2	3	54
201-300	30	—	1	2	33
301-400	17	—	1	—	18
401-500	14	—	—	2	16
501-700	21	—	1	2	24
701-1000	19	—	—	—	19
1000+	38	—	3	1	42
Total	410	6	24	13	453

The total milk licensed to be sold in New Hampshire was 195,088 quarts per day, or 153 million pounds in one year.† Vermont dealers were licensed to sell 4,164 quarts per day, Maine dealers 246 quarts per day, and Massachusetts dealers 32,176 quarts per day in New Hampshire. Out-of-state dealers were licensed to sell, therefore, 19 percent of the milk sales in New Hampshire. It should be pointed out that the license size is based on an estimated daily average for the year. Therefore, sales will be greater than the licensed quantity during certain seasons and less than the licensed quantity during others. Dealers located in New Hampshire with licenses for 100 quarts and over per day were licensed to sell a total of 153,133 quarts per day. These dealers comprised the group studied.

The Meaning and Size of Surplus

The term "surplus" is applied to milk purchased by a dealer which is in excess of that required for fluid sales.* The milk purchased by dealers or produced in their own herds is sold in fluid form and as milk products. The size of the surplus each day will depend on the amount sold as fluid milk. Fluid milk is the most general form of sale in New Hampshire, and the

† Total milk production in N. H. in 1955 was approximately 370 million pounds, of which 190 million pounds was shipped to markets in Massachusetts and Vermont.

* The term "surplus" as used by the trade, may give rise to misunderstanding. "Milk in non-fluid uses" is preferable.

maximum amount is so used. However, there are demands for milk by-products and there are unpredictable changes in demand for fluid milk which require certain necessary reserves. The surplus sales average between 18 and 25 percent of total milk purchases in New Hampshire. The seasonal variation is apparent in Table 2.

Table 2. Surplus Sales as Percent of New Hampshire Dealer Total Purchases by Months in 1955

	(Whole Milk Equivalent)
Jan.	18.4
Feb.	19.6
Mar.	20.3
Apr.	21.4
May	23.8
June	25.3
July	23.9
Aug.	23.8
Sept.	23.7
Oct.	20.3
Nov.	20.3
Dec.	21.0

Table 3. Surplus Sales as Percent of New Hampshire Total Milk Purchases by Dealer Size—1955

	(Whole Milk Equivalent)
Size by License	Percent
(Qts. per day)	
100-200	29.0
201-300	21.9
301-400	11.0
401-500	14.6
501-700	17.9
701-1000	24.2
1000+	35.4

In addition, there is some variation in the proportion of surplus sales according to the size of the dealer. The largest dealers have a larger percentage of their total sales as milk by-products than the small dealers, with the possible exception of the producer-distributors represented by the 100-200 qt. license group (Table 3).

How Surplus Milk Is Used

Whole Milk and Cream

Estimates of the utilization of surplus milk, including the purchases of products for resale, show that heavy cream is the most important outlet. The other uses will depend on the particular dealers' processing facilities. For example, the smaller producer-distributors will separate their heavy cream requirements and then sell the remainder of their surplus fluid milk to other dealers. The skim milk left from the cream is either dumped or fed to livestock. Dealers with processing plants, on the other hand, will be able to produce flavored drinks, ice cream, and skim milk products.

In order to obtain a picture of utilization, in Table 4, the cream used in heavy and light cream, butter, and ice cream was converted to whole milk equivalent. This, plus the whole milk used in these products and the whole milk sold at blend or surplus prices made up the total surplus milk handled by dealers during the year 1955. The high proportion which is used as cream is particularly apparent in the medium-size dealer groups.

Skim Milk and Skim Milk Products

The skim milk left after separation is utilized as cottage cheese, flavored drinks, buttermilk, powder, or as non-fat fluid milk for sale at retail. It is also dumped or used for livestock feed. The pattern of utilization will vary

Table 4. Percent Utilization of Surplus by New Hampshire Dealers by Type of Product and Size of Dealer—1955
(Including purchase of products)

Dealer Size by Qts. per Day License	Average Surplus Handled (lbs.)	Percent							
		Heavy Cream	Light Cream	Fluid Drinks	Ice Cream	Whole at Surplus Price	Whole at Blend Price	Butter	Other
100-200	49,973	49.6	—	1.3	—	—	46.7	1.2	1.2
201-300	55,460	41.2	27.2	1.0	—	10.9	14.4	5.3	—
301-400	34,456	71.5	—	4.3	—	—	14.4	9.8	—
401-500	60,660	90.0	—	2.7	—	.5	—	6.8	—
501-700	102,408	77.9	9.5	6.5	—	3.4	—	1.0	1.7
701-1000	218,837	69.6	10.4	3.3	10.8	5.3	.4	.2	—
1000+	1,686,823	55.3	10.9	2.1	8.0	17.3	—	5.1	1.3

Table 5. Utilization of Skim Milk Handled in New Hampshire by Size of Dealer for 1955

Size Group	Average Skim Equivalent Handled lbs.	Percent						Av. lbs. Skim Fed or Dumped per Dealer
		Cottage Cheese	Flavored Drinks	Retail Skim	Buttermilk	Skim Powder	Livestock Feed or Dumped	
100-200	5,781	—	5.6	3.3	—	—	91.1	5,267
200-300	18,136	1.5	1.4	8.5	—	—	88.5	16,054
300-400	14,383	20.5	5.1	.6	—	—	73.9	10,623
400-500	22,029	5.1	3.7	3.6	—	—	87.6	19,293
500-700	18,913	32.6	20.1	6.7	3.7	—	36.8	6,972
700-1000	70,006	54.1	5.1	7.7	2.6	—	30.5	21,328
1000-	316,749	49.3	5.5	16.7	3.1	7.2	18.2	57,778

between different dealer size groups and between months of the year as supplies and demand change. It will also vary according to the preferences of different dealers, their facilities, and their willingness to handle the many products which can be made from skim milk. If there are no processing facilities and the quantity is small, the economics of using skim milk profitably are open to question. This is shown in the large proportion of skim milk which is dumped by the smaller dealers.

The skim products handled by dealers may be produced at the plant or they may be purchased. For example, cottage cheese is sold by most of the dealers but the medium-size dealers depend on purchases for their supply. The large dealers not only make their own but also purchase additional supplies. Similarly, buttermilk is purchased by dealers. On the other hand, retail skim milk and skim milk used in flavor drinks is from their own supply.

A large proportion of the skim milk produced as a by-product of heavy cream is not used commercially. It is dumped down the drain or used on the home farm. Some few farmers pick up supplies from their dealer for livestock feeding.

A pattern of skim milk utilization by dealer size is given in Table 5. The proportion of skim milk which is dumped or fed to livestock declines as the size of dealer increases from 91 percent for the smallest group to 18 percent for the largest group.

Similarly the proportion of skim milk handled as cottage cheese is greater for the larger dealers. The dealers up to 700 quarts per day size group buy all of their cottage cheese but the larger groups make most of their own cheese. Other skim milk uses, such as in flavored drinks and as retail skim milk, do not vary proportionately with the size of dealer. All sizes of dealers make these products from their own skim milk.

Seasonality of Production in Skim Products

The proportions of skim milk used in the various product outlets remain fairly uniform through the year. The decrease in the proportion moving as cottage cheese during June and July is due to the diversion of increased quantities of skim powder for use in the manufacture of ice cream during the summer.

This uniformity of the proportion of sales in each product is not matched with a similar uniformity in production. The diversion of skim milk during some months and the purchase of skim milk products to supplement supplies during other months introduces problems. The excess skim introduces a sales or disposal problem. The purchases to supplement skim product supplies presents a buying problem. An efficient operation will include a profitable sales policy for excess skim and an economic purchase program for other products when needed.

Almost all dealers buy products made from skim milk for resale. At the same time, those separating cream will dump the skim milk so produced. For example, in May, dealers dumped 49 percent of their skim milk while buying 11 percent of their skim milk requirements in the form of products.

Table 6. Percentage of Sales of Skim Milk and Skim Milk Products by Month, 1955

Month	Cottage Cheese	Flavored Drink	Retail Skim	Butter Milk	Skim Powder	Total
Jan.	67.8	5.1	20.6	3.9	2.6	100
Feb.	66.2	5.0	19.5	3.7	5.5	100
Mar.	65.0	4.9	19.1	3.7	7.3	100
April	66.3	5.6	19.0	3.9	5.1	100
May	63.5	6.3	20.5	3.9	5.8	100
June	55.1	7.4	18.3	3.5	15.8	100
July	57.1	10.5	17.4	3.9	11.1	100
Aug.	57.6	11.1	18.2	4.7	8.4	100
Sept.	67.3	10.0	21.2	3.7	2.9	100
Oct.	62.1	9.4	18.6	3.5	6.4	100
Nov.	63.6	9.2	20.5	3.2	3.4	100
Dec.	62.0	9.4	18.8	2.8	7.0	100

(See Table 7.) Cottage cheese is the most popular purchased item, followed by buttermilk. This means that many dealers have no capacity for making cottage cheese and buttermilk, but do consider themselves able to produce cream, and throw away the resulting skim.

The disposal problem, while present all year, is greatest during April, May and June. The purchase problem, on the other hand, reaches the peak during July and August. Any discussion of the profitable operations of a milk handler should include an examination of the potential uses for the skim milk not now reaching commercial channels. It should also include a discussion of the most economic sources for purchasing skim milk products. July and August are the months of highest purchases. We find also in Table 8 that the purchases of all by-products comprise a larger proportion of sales for the medium-sized dealers than either for the very small or large dealers.

Table 7. Relationship of Skim Milk Dumped to Skim Milk Equivalent Purchased as Products by Months—1955

	Percent Dumped	Percent Purchased
Jan.	16.6	14.7
Feb.	28.1	15.0
Mar.	34.8	14.9
April	44.1	10.7
May	48.9	10.6
June	43.3	19.8
July	20.6	41.7
Aug.	19.0	36.8
Sept.	17.3	19.1
Oct.	31.7	22.2
Nov.	19.7	27.6
Dec.	31.6	23.0

Table 8. Percent of Annual Non-Fluid Sales From Purchases of Milk By-Products.

Size of Dealer	Percent Purchased as By-Products
100-200	34
201-300	35
301-400	44
401-500	64
501-700	74
701-1000	55
1000+	55

Seasonal Patterns

Dealers with regular producers purchase the total production of these farms during the year. The level of production is not constant throughout the year. It tends to increase from February through May and then decreases.

Consumption, on the other hand, reaches its peak in the months of July and August with the increase starting in June. Faced with increased production without a similar increase in demand, dealers have milk in excess of normal market requirements during the months of February through June. During the months of July and August, however, the consumer demand for fluid milk and by-products is greater than the supply of their regular producers. The chart on the cover indicates the seasons of surplus and deficit supplies.

Table 9. Percent of Total By-Product Sales Which Are Purchased in Product Form by Dealers by Months For, 1955

Month	Percent Purchased as Class II Products
Jan.	53
Feb.	50
Mar.	48
April	41
May	34
June	41
July	70
Aug.	69
Sept.	54
Oct.	50
Nov.	56
Dec.	52

The procurement problem is met by dealers buying additional milk by-products, from other dealers, both in and out of the state. This is illustrated in Table 9, which shows the proportion of Class II sales which are purchased.

Location of Supplies

The distance that dealers must travel to procure their supplies depends on the quantity needed and the availability of milk for sale. The milk which is produced in New Hampshire for sale in the Greater Boston marketing area has generally been contracted to dealers for the entire year. If so, then this is not generally diverted to New Hampshire dealers under present agreements. This does not presuppose the possibility of revised agreements, however. Small dealers rely on larger dealers, and the larger dealers travel to Vermont and Massachusetts to pick up supplies of both fluid and non-fluid milk products.

The distance travelled by dealers of all sizes to buy additional supplies is as follows:

Table 10. Distance Travelled by Dealers to Purchase Additional Milk

Miles	Percent of Total Trips to Buy Class I.	Class II.
30 miles or less	64	52
30 miles or more	36	48
In-state	63	45
Out-of-state	37	55

The majority of the purchased milk is shipped in from out of state.

Return from Surplus Sales

The supply of milk moving into fluid use is controlled by the dealers to meet market needs. In New Hampshire the purchase and sale prices are controlled under the State Milk Control Act. The price spread available to dealers, therefore, is about the same irrespective of size. Any gains by one dealer size group relative to another will depend on its costs. Given the same price margin, then the lower cost dealers will gain greater net returns than the higher cost operators.

The price spread available to dealers from the sale of surplus milk, however, will depend on the form in which the milk is sold. The use of surplus in cream only, for example, will provide a lower margin than when sold as cream and cottage cheese. Variations in supply, however, mean that the dealer must continually change his production and sales pattern if he expects to maximize his returns. For any particular dealer an increase in the surplus to be handled, when he is operating on a set utilization pattern, will generally force him to sell an increased quantity of his surplus on a low return market. This will automatically reduce his spread. Such sales are made on "irregular" markets. The variation in price spread in fluid or Class I markets and in Class II or surplus markets is given in Table 11. The relatively lower returns on Class II products is apparent.

Table 11. Price Spread Per Quart from the Sale of Purchased Fluid Milk and its Derived Surplus Products as Based on the Typical Utilization of New Hampshire Milk Dealers, by Size Groups

(Qts. per Day) Size Group	Class II Percent	Per Qt. (Cents) Spread Class I	Per Qt. (Cents) Spread Class II	Per Qt. (Cents) Spread Blend
100-200	24.26	10.58	4.00	9.21
201-300	17.84	10.58	2.75	9.37
301-400	9.96	10.62	3.10	10.16
401-500	6.40	10.53	1.83	10.01
501-700	4.20	10.53	6.26	10.38
701-1000	11.37	10.49	6.41	10.07
1000+	19.49	10.32	6.43	9.60

An example of the returns obtainable from milk sold as different types of by-products is given in Table 12. It is apparent that the higher returns are received when the skim by-product is retained in fluid form or is used for cottage cheese in addition to the sale of cream. This assumes there is a market for the skim milk. Once this assumption is removed, however, and the skim milk is dumped or otherwise disposed of, then the margin to dealers from handling surplus is greatly reduced.

A Restatement of the Problem

Based on our previous analysis, the milk purchased by dealers in excess of that sold on fluid markets results in waste resources, for which there may be some economic solution. The profit or returns obtained by dealers will depend on their managerial ability, on their particular location, and on the utilization pattern followed.

Table 12. Price Spread on 100 Pounds of Milk at $3.53 per Hundredweight. Utilized in the Production of Various By-Products—1955

Product	Total Return per Cwt. Dollars	Spread per Cwt. Dollars	Spread per Qt. Cents
Heavy cream*	4.826	1.296	2.79
Light cream*	5.908	2.378	5.11
In ice cream*	6.293	2.76	5.94
Heavy cream plus skim sold at retail	11.108	7.58	16.29
Light cream plus skim sold at retail	11.492	7.96	17.12
Heavy cream plus skim sold as cottage cheese	9.450	5.92	12.73
Ice cream plus skim sold at retail	11.66	8.13	17.49
Ice cream plus skim sold as cottage cheese	10.24	6.71	14.40

* Skim dumped.

Average price-cost spreads on surplus products for dealers as a group are lower than these spreads earned on fluid sales. The practice of selling cream only results in skim milk losses.

As skim milk production depends on cream sales, it would be opportune to re-examine methods of procuring cream as currently practiced. It is generally assumed that the handling of skim milk is unprofitable for small dealers and dealers without facilities for by-product manufacture. However, these same dealers face a demand for cream from their customers. They must then decide whether to buy the cream or process their own. This decision will depend on the location of a market for surplus milk and on the supply of cream. In addition they buy surplus products from other dealers to supplement their fluid sales. If there is no market for surplus milk as whole milk, then there is no alternative but to separate into cream and skim milk. This may well be the case for many New Hampshire dealers and is a basic reason for the waste of skim milk.

Statewide Surplus

The total surplus milk handled in New Hampshire in one year as milk and as products is approximately 75 million pounds milk equivalent. Of this amount, 34 million pounds is produced as a result of the fluid milk sales and is in excess of fluid requirements. Half of the surplus is produced at seasonal peaks and cannot be used in the normal dealer business. Therefore, it is disposed of as whole milk, priced considerably below the blend price. The other half is used by dealers to produce cream, cottage cheese, and by-products to meet consumer demand. Of this 17

Table 13. Approximation of Total Milk Surplus (Whole Milk Equivalent) in New Hampshire—1955

	Million Pounds
Total surplus	75
Purchased as products for resale	41
From fluid milk purchase	34
Sold in fluid form (Class II)	17
Processed into by-products	17

million pounds, about 4 million pounds as skim milk is dumped or otherwise wasted.

The remaining 41 million pounds milk equivalent of surplus milk sold is purchased by dealers in product form from other dealers, many of whom are located out of the state. If these by-products were purchased by New Hampshire dealers as fluid milk for manufacture by them, then applying the same ratio of 4 skim to 17 whole, there would be an additional 9 million pounds of skim milk not used. The use of skim milk as feed for the benefit of the poultry industry may hold possibilities which should be examined.

The loss from waste products could be reduced if dealers purchased a greater proportion of their sales in by-product form, provided there were adequate facilities for utilizing the skim milk at the point of purchase.

To carry this one step further, the waste of skim milk could be minimized, if dealers shipped their excess fluid milk to a central processing plant, large enough to economically utilize the skim milk. The dealers could then, in turn, purchase much of their cream and other by-products as needed, and reduce the cost of processing in their plants.

Modern tank-truck handling of milk will minimize the transportation costs. The milk dealers in New Hampshire are located sufficiently close to make such a proposal possible. Such a plant would best be operated as a dealer cooperative venture. The returns to dealers from the sale of skim milk and other profitable by-products will increase. Considering the low margins which many dealers are currently earning on their surplus milk operations, this proposal would be a means of increasing their income and of enlarging the market for producers.

Are Supplies Adequate for a Plant Operation?

The total supply of milk in excess of fluid requirements in New Hampshire is approximately 34 million pounds. From this amount can be deducted the requirements by dealers for light cream, retail skim, and flavored drinks, plus a one percent shrinkage. These supplies will be kept by dealers in the normal business operations. The revised estimated supplies would thus be about 23 million pounds in a year. The particular supply pattern of milk producers would provide the average daily supplies by months shown in Table 14.

Table 14. Average Daily Supplies of Milk Available For Plant Operation, 1955

Month	Pounds
Jan.	47,256
Feb.	54,500
Mar.	75,746
April	97,060
May	129,760
June	129,344
July	26,320
Aug.	17,048
Sept.	59,129
Oct.	36,162
Nov.	37,383
Dec.	45,489

The greater supplies in May and June and the smaller supplies in July and August provide the greatest obstacle to an even use of plant capacity.

This operating problem is not insurmountable, however, and should not deter from the use of such a plant.

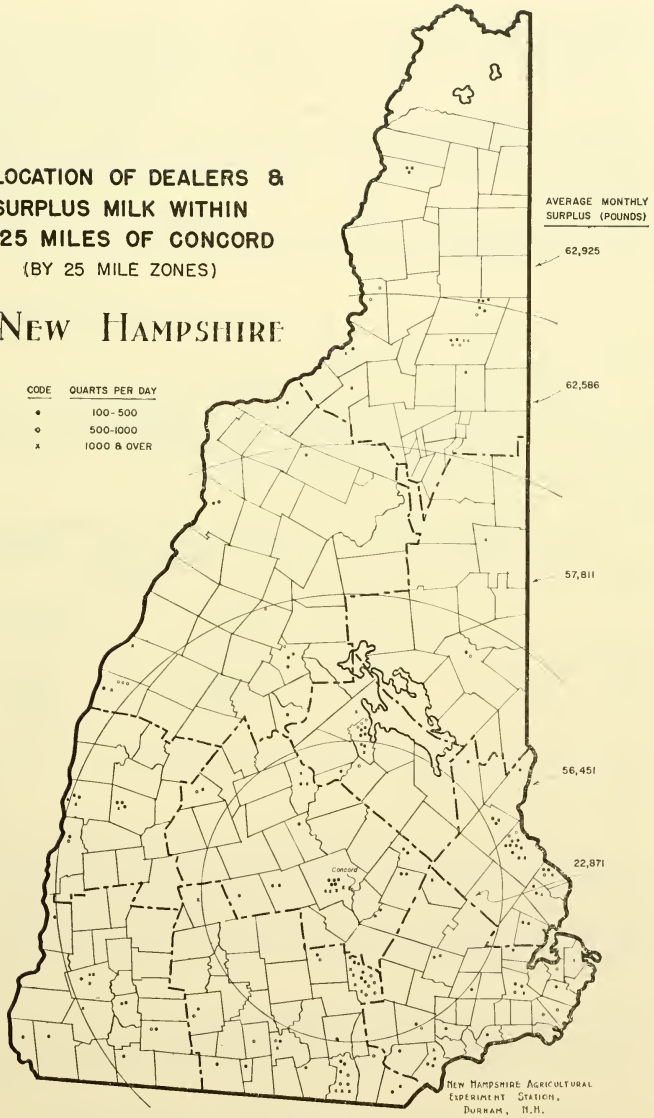
LOCATION OF DEALERS & SURPLUS MILK WITHIN 125 MILES OF CONCORD
(BY 25 MILE ZONES)
NEW HAMPSHIRE
CODE
QUARTS PER DAY
100-500
500-1000
1000 & OVER
AVERAGE MONTHLY SURPLUS (POUNDS)
62,925
62,586
57,811
56,451
22,871
Concord
NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION, DURHAM, N.H.

Figure 2.

Location of Plant

The selection of a suitable location is based on the objective of minimizing the total transportation costs. By a process of approximation the supplies of surplus milk within increasing radii of selected locations favored Concord, New Hampshire. At this center more surplus milk was available within a radius of 55 miles than for Laconia, Manchester, or Nashua. To obtain the same amount of milk as is located within 55 miles of Concord would require a radius of 60 miles from Laconia, 65 from Manchester, and 90 from Nashua.

In addition, the existing highway pattern favors Concord which is serviced by main highways from all parts of the state.

Cost of Plant

Estimates of cost for a size of plant adequate to handle the available surplus have been drawn from study of butter-non-fat dry milk plants of the western region of the United States.*

The annual expenses per 100 lbs. of milk handled totals 62 cents. The approximate cost of building and equipment plus necessary supplies would be $250,000. Of course, if a building currently available can be used and some of the existing equipment and supplies converted to the new operation, then the capital costs could be reduced considerably.

Table 15. Total Annual Expense per 100 lbs. of Milk Processed.

Function	Cost per 100 lbs.
Overhead	.29
Joint-operating	.11
Product manufacturing	.05
Powder manufacturing	.17
Total	.62

Table 16. Estimated Capital Cost of Processing Plant Large Enough to Handle Estimated New Hampshire Surplus

Capital	Dollars
Building	67,000
Equipment	163,000
Supply Inventory	20,000
Total	250,000

Full Cooperation Needed

The success of any such venture requires the complete cooperation of the dealers in the state. Cooperative sharing of the costs would reduce the individual load. In addition, each member would be actively interested in the financial and operational success of the plant. This would be the source of supply for milk by-products for all cooperating dealers and would relieve them of the inconveniences and higher costs of processing their own surplus products, and of wasting skim milk.

Alternative to a Central New Hampshire Plant

The existing facilities of the NEMPA milk drying and processing plants at Andover, Springfield, and Worcester, Massachusetts, provide outlets for

* "An Economic Analysis of Butter-non-fat dry milk plants—Walker, Preston, and Nelson." Research Bulletin 20. University of Idaho, June, 1953.

surplus milk to nearby farmer members of the organization. More complete use of New Hampshire surplus and a working arrangement with these plants may be a substitute for a dealer-owned plant in New Hampshire.

Transportation Plan

The use of either scheme would necessitate a working plan for transportation of milk and cream to and from New Hampshire dealers. Modern tank trucks make this a low cost possibility with their combination cans and tank conveyances.

There is already a large trade between dealers in by-products. The advantage of a centralized operation, from the reduced cost possible by economies of scale in processing and distribution, would increase the total returns from the sale of milk.

SUMMARY

1. The milk sold by New Hampshire dealers in excess of fluid sales varies from 18 to 25 percent of their total milk purchases.

2. The major sales of surplus milk are as cream and cream products.

3. The majority of skim milk produced as a by-product of cream sales is wasted.

4. The peak milk production months in New Hampshire do not coincide with the peak consumption months for milk and milk products. This creates both disposal and procurement problems for dealers.

5. Additional supplies of surplus products are purchased in processed form even though excess fluid milk is being sold on surplus fluid markets at little or no profit, and skim is being wasted.

6. Under present utilization patterns, the price-cost spread for the sale of fluid milk exceeds the price-cost spread for the sale of surplus products produced by New Hampshire dealers except when the skim milk is included in the sale. The returns from surplus milk sales are reduced because skim milk is wasted.

7. The total surplus products handled by dealers in the state approximate 75 million pounds of milk equivalent. Of this amount 34 million is a by-product of the fluid milk industry and available within the state.

8. The surplus milk is processed or sold by individual dealers but if processed in one place would provide sufficient milk to operate a plant efficiently, eliminate waste of skim milk, and provide other products currently sold by dealers at reduced cost.

A continued study of the operational problems associated with such a plant would be beneficial to the industry and is currently underway.

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